

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Phase diagram of rod-coil diblock copolymer melts by self-consistent field theory DADONG YAN, Department of Physics, Beijing Normal University, JIUZHOU TANG, Institute of Chemistry, Chinese Academy of Sciences, YING JIANG, School of Chemistry and Environment, Beihang University, XINGHUA ZHANG, School of Science, Beijing Jiaotong University, JEFF CHEN, Department of Physics and Astronomy, University of Waterloo — A unified phase diagram is presented for rod-coil diblock copolymer melts in the isotropic phase regime as a function of the asymmetric parameter. The study is based on free-energy calculation, which incorporates three-dimensional spatial variations of the volume fraction with angular dependence. The wormlike-chain model is used in a self-consistent field treatment. Body-centered cubic, A15, hexagonal, gyroid, and lamellar structures where the rod segments are packed inside the convex rod-coil interface are found stable. As the conformational asymmetric parameter increases, the A15 phase region expands and the gyroid phase region reduces. The stability of the structures is analyzed by concepts such as packing frustration, spinodal limit, and interfacial curvature.

Dadong Yan
Beijing Normal Univ

Date submitted: 05 Nov 2015

Electronic form version 1.4